Draft
Alternatives Analysis Methodology
SR 20 Improvements from Canton to Cumming
(PI Nos. 0002862, 0003681, 0003682)

Prepared for the
Georgia Department of Transportation

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Definitions of Acronyms

Agency Coordination Plan	ACP
Atlanta Regional Commission	ARC
Area of Potential Effect	APE
Citizens Advisory Committee	CAC
Code of Federal Regulations	CFR
Council on Environmental Quality	CEQ
Draft Environmental Impact Statement	DEIS
Economic Impacts Assessment	EIA
Environmental Protection Division (Department of Natural Resources)	EPD
Environmental Impact Statement	EIS
Environmental Procedures Manual	EPM
Final Environmental Impact Statement	FEIS
Federal Highway Administration	FHWA
Georgia Department of Transportation	GDOT
Interstate	I
Moving Ahead for Progress in the 21st Century	MAP-21
National Environmental Policy Act	NEPA
Official Code of Georgia Annotated	OCGA
Public Involvement Plan	PIP
Public Information Open House	PIOH
Record of Decision	ROD
Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users	SAFETEA-LU
State Route	SR
Technical Advisory Committee	TAC
Transportation Improvement Program	TIP

1.0 INTRODUCTION

The Georgia Department of Transportation (GDOT) and the Federal Highway Administration (FHWA) have initiated the Environmental Impact Statement (EIS) for the proposed State Route (SR) 20 Improvements from between I-575 in Canton and SR 400 in Cumming as required by Section 6002 of Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and amended by Section 1305 of Moving Ahead for Progress in the 21st Century Act (MAP-21). The SR 20 Improvements project includes engineering and environmental studies to evaluate potential solutions to address congestion, mobility, and safety concerns along SR 20 between Canton and Cumming.

GDOT, as the project sponsor, in coordination with FHWA, the lead Federal agency, have developed an Alternatives Analysis Methodology to document the proposed process of identifying, evaluating, and advancing alternatives for further analysis, with an overall goal of identifying a preferred alternative during the DEIS process. The methodology includes the consideration of increasingly detailed analysis criteria consistent with the project's Need and Purpose, as well as discussion with stakeholders and the public, to be engaged in the process of advancing alternatives. The Council on Environmental Quality requires that agencies avoid, minimize, and mitigate impacts per the National Environmental Policy Act (NEPA) and FHWA mitigation policy requires mitigation to be included as an integral part of the alternatives development and analysis process. The public will have the opportunity to review and comment on all avoidance, minimization and mitigation measures during the NEPA process.

This Alternatives Analysis Methodology serves as the foundation for the development and evaluation of the project alternatives that will be documented in the Alternatives Analysis Technical Report as the methodology is implemented. Ultimately, the Alternatives Analysis Technical Report will document the process of the identification and analysis of potential alternatives and serve as an appendix to the DEIS.

2.0 ALTERNATIVES SCREENING FRAMEWORK

This Alternatives Analysis Methodology was developed in a cooperative effort between GDOT and FHWA. As part of the agency roles and responsibilities established under SAFETEA-LU (amended by Section 1305 of MAP-21) and the Council on Environmental Quality, the participating and cooperating agencies are afforded opportunities to provide comment on the methodology or screening results during:

- The Agency Scoping Meeting (held on May 20, 2013);
- Ongoing agency collaboration opportunities; and
- Coordination in support of EIS documentation

Input will also be gathered from stakeholders including the public on a regular basis throughout the alternatives development and screening process using a variety of methods at key milestones, including:

- Public Information Open Houses (PIOH)
- Public Hearing Open Houses (PHOH)
- Technical Advisory Committee (TAC) workshops
- Citizens Advisory Committees (CACs) workshops

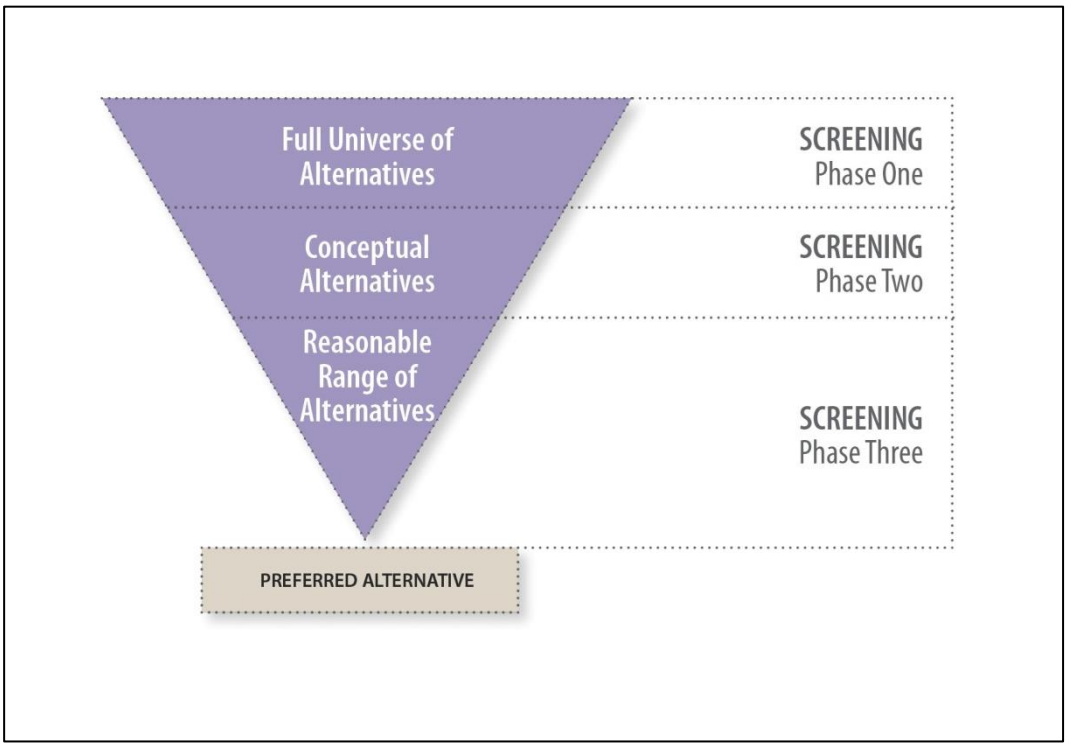
- Website input and comment forms

Further detail on stakeholder and public outreach activities is available in the project's *SR 20 Improvements from Canton to Cumming Public Involvement Plan, May 2013,* available at www.dot.ga.gov/sr20improvements.

2.1 Alternatives Screening Overview

As presented in Figure 2.1, a series of screening phases will be applied to evaluate a universe of potential alternatives against performance criteria consistent with the project's Need and Purpose. This phased screening process will ultimately lead to the identification of a Preferred Alternative to carry through the NEPA process. Each screening phase will presumably narrow the universe of potential alternatives, as those that perform the best against increasingly detailed criteria will advance for further consideration.

Figure 2.1: Alternatives Screening Overview



2.2 Phased Screening Process

NEPA requires all Federal agencies to consider "all reasonable alternatives." According to CEQ's, Question 2a in *NEPA's Forty Most Asked Questions,* "reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant regulations." For the purposes of NEPA, reasonable means those alternatives

which may be feasibly carried out based on technical, economic, environmental, and other factors.

The project's Need and Purpose has been developed based on technical analysis and community feedback received during the scoping process from the project TAC, CAC, and the public. To support the development of the reasonable range of alternatives to be evaluated in detail in the DEIS, initial performance criteria consistent with the project Need and Purpose Statement are proposed.

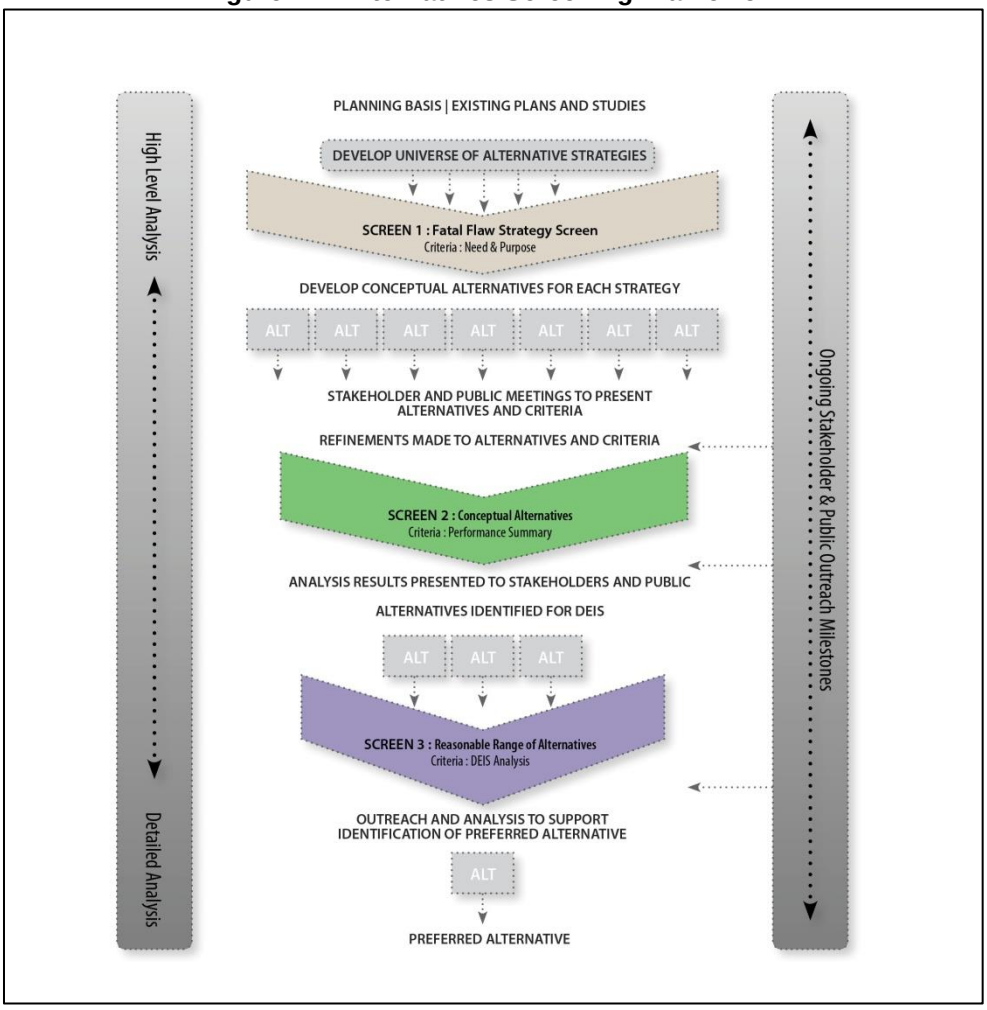
The Alternatives Screening Framework in Figure 2.2 presents the process by which potential improvement alternatives will be developed and evaluated. The alternatives screening process will incorporate a progressively detailed level of analysis at each screening phase based on performance criteria and metrics that are consistent with the project's Need and Purpose, and culminating in the identification of a Preferred Alternative to recommend during the development of Draft Environmental Impact Statement (DEIS). The screening phases include:

- Screen 1: Fatal Flaw Strategy Screening
- Screen 2: Screening of Conceptual Alternatives to identify the Reasonable Range of Alternatives
- Screen 3: Screening of the Reasonable Range of Alternatives during the DEIS analysis to identify a Preferred Alternative

Each screening phase incorporates a stakeholder and public involvement component affording stakeholders and the public the opportunity to review and comment on the process, the proposed alternatives, the evaluation criteria, and the relative performance of each alternative when compared against an established set of performance criteria. This process will support the identification of alternatives acceptable for further consideration based on performance and consistency with the project's Need and Purpose.

The Alternatives Analysis Technical Report will document all alternatives considered and advanced during the evaluation process. The proposed steps of each screening phase are outlined in the following section.

Figure 2.2: Alternatives Screening Framework



Note: The graphic above is illustrative in nature and the actual number of alternatives to be carried forward through each stage of screening is dependent on analysis results.

2.2.1 Screen 1: Fatal Flaw Strategy Screen

Step #1: Develop Universe of Alternatives

The first step in the alternatives evaluation process is to determine the full Universe of Alternatives. This initial step will identify alternatives based on the planning basis for action and consider previous plans and studies that have identified the need for improvements to SR20. At this stage, the alternatives will be strategic approaches to addressing transportation issues in the corridor. The initial list includes:

- Roadway improvements such as:
  - Widening
  - New location
  - Partial new location

    - Spot Improvements such as adding turn lanes, signal optimization, intersection improvements (also referred to as a Transportation System Management Alternative (TSM))
    - Rerouting or partial rerouting of the SR 20 designation along other existing facilities (for example, along SR 400 North to Exit 15, Bald Ridge Marina Road)
- Transit, and
- Rail

Once the initial strategies are identified as reasonable to advance beyond this initial screening, they will be developed with further specificity. In addition, a No-Build Alternative will be considered for comparative analysis alongside the build alternatives.

Consistency with the goals, objectives, and policies of the federally-adopted Regional Transportation Plan for the region, ARC's Plan 2040 is among the considerations for advancement of strategies for further consideration and refinement. Because the RTP includes adopted system-wide plans for the region developed through detailed multi-year planning studies, it is anticipated that a recommendation on transportation mode will be disclosed during this initial screening phase.

Step #2: Compare Universe of Alternatives to the Project's Need and Purpose

A series of criteria highlighting each strategy's potential to address the project's Need and Purpose and supporting objectives will be considered during Screen 1. The project's Need, Purpose, and Objectives are summarized as follows:

Need: Improve Mobility for People and Goods

Objectives:

1. Accommodate local trip movements
2. Accommodate regional trip movements
3. Maximize operational efficiency
4. Improve access to regional activity centers for passenger and freight vehicles
5. Improve east-west mobility for passenger and freight vehicles

Need: Reduce Congestion

Objectives:

1. Accommodate current and future travel demand
2. Reduce traveler delay

Need: Address Safety

Objectives:

1. Reduce potential for severe crashes
2. Minimize conflicts (vehicle/vehicle, vehicle/non-vehicle, access [e.g. intersections, driveways, etc.])

Step #3: Present Results

A summary of Screen 1, a qualitative assessment of each strategy's potential to address the project's Need and Purpose, will be presented to the lead agencies as well as the TAC, CACs, and general public prior to advancement and further refinement during Screen 2. A preliminary look at the strategy matrix is presented in Table 2.2.1 on the following page. The results of the screening will be presented using a qualitative labeling system, illustrated in Figure 2.2.1, for comparative purposes to indicate the strategy's relative ability to address the Need and Purpose. The results table will clearly indicate whether or not the strategy will move forward for development into a conceptual alternative as a part of Screen 2.

Table 2.2.1: Example Screen 1 Strategy Matrix

N&P	Objectives	Criteria	Considerations	Qualitative Rating (see Figure 2.2.1)
Increase Mobility for People and Goods	1. Accommodate local trip movements	Travel patterns	Can the strategy potentially address local trips?	TBD
	2. Accommodate regional trip movements	Travel patterns	Can the strategy potentially address regional trips?	TBD
	3. Maximize operational efficiency	Efficiency	Can the strategy potentially improve efficiency by increasing vehicular throughput?	TBD
	4. Improve access to regional activity centers for passenger and freight vehicles	Travel time savings	Can the strategy potentially decrease travel times?	TBD
	5. Improve east-west mobility for passenger and freight vehicles	Travel patterns	Can the strategy potentially address east-west movements?	TBD
Reduce Congestion	1. Accommodate current and future travel demand	Capacity	Can the strategy potentially enhance capacity by adding lanes or shifting traffic to parallel facilities?	TBD
	2. Reduce traveler delay	Travel time savings	Can the strategy potentially decrease travel times?	TBD
Improve Safety	1. Reduce potential for severe crashes	Design Features	Can the strategy potentially reduce the potential for severe crashes by adding shoulders, correcting skews, and other geometric improvements?	TBD
	2. Minimize conflicts (vehicle/vehicle, vehicle/non-vehicle, access [e.g. intersections, driveways, etc.])	Access Management	Can the strategy potentially reduce access conflicts and vehicular conflicts through access management treatments such as medians, reduced driveways, and intersection improvements?	TBD

Figure 2.2.1: Qualitative Labeling Scheme

Rating	
Exceeds	●
Meets	◒
Needs Improvement	○

Step #4: Advance Alternatives

The alternative strategies identified as consistent with the project's Need and Purpose will advance to Screening Phase 2 and will be further developed into specific conceptual alternatives.

2.2.2 Screen 2: Screening of Conceptual Alternatives

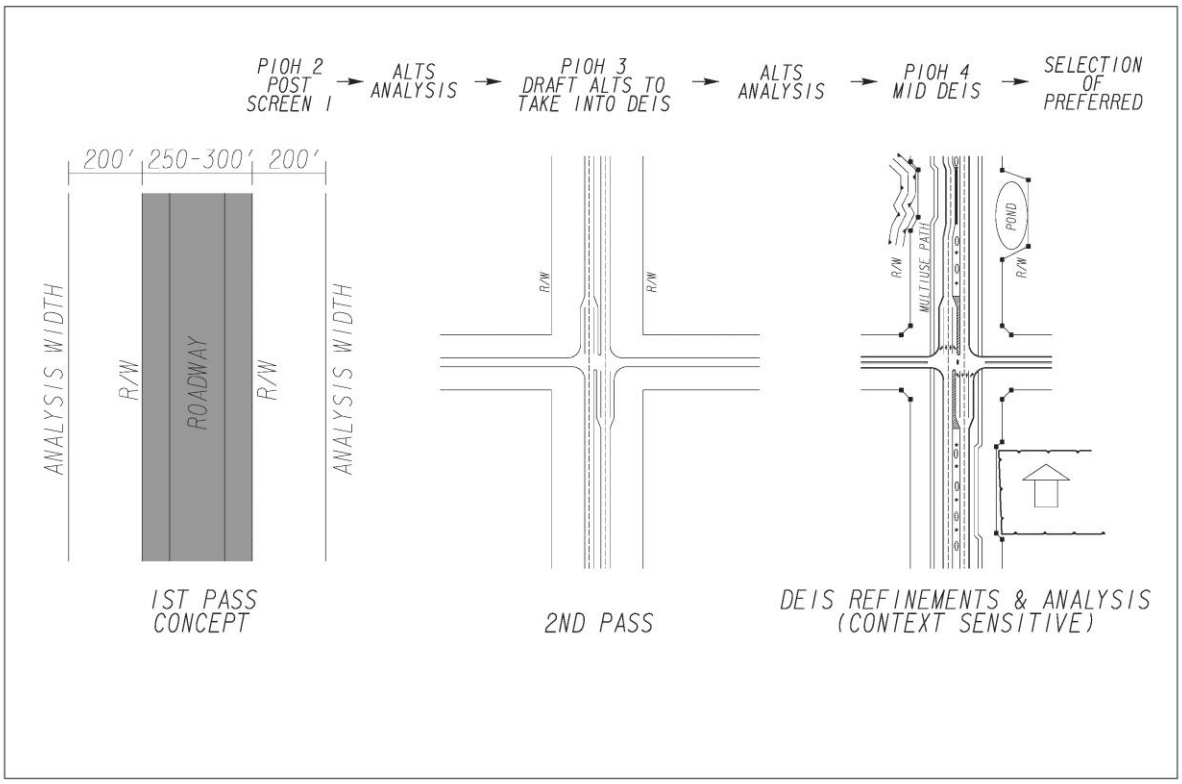
Step #1: Develop Conceptual Alternatives

Screen 2 will further scrutinize potential solutions against established performance criteria consistent with the project's Need and Purpose and inform the identification of the most promising alternatives to advance for further analysis. Conceptual engineering details will be developed for each, including corridor location and typical section, such that performance can be measured against criteria in the areas of transportation performance, environmental resources, cost, and community impacts. The initial list of strategies will grow into more specific, detailed build alternatives, such as:

- No Build Alternative
- Transportation System Management (e.g., spot intersection improvements, including grade separation)
- Widen existing roadway (i.e., from 2-lanes to 4-lanes, 4-lanes to 6-lanes, etc.)
- New location roadway
- Partial new location
- Rerouting / partial rerouting
- Some combination of the options listed above.

An initial look at conceptual alternatives is presented in Appendix A. These will be refined during the project development process based on input from GDOT and shared with stakeholders and the public during a series of public outreach activities for comment. Then, they will be further refined and/or supplemented based on input from stakeholders and the public. Figure 2.2.2 below demonstrates the stepwise process that will be applied as alternatives are developed and refined. Initial conceptual alternatives are represented in the far left of the figure, with high-level assumptions made regarding right-of-way and analysis widths. This is discussed in further detail in the sections that follow. As alternatives advance through the screening process, additional refinements and design details will be developed.

Figure 2.2.2: Alternative Refinement Process



Step #2: Develop Performance Criteria

Criteria highlighting project performance, potential environmental and community impacts, and cost will be considered during Screen 2. Initial criteria are presented in Table 2.2.2. At this step in the process, meetings will be held with stakeholders and the public to vet criteria and initial alternatives. Both the criteria and the alternatives will be refined and/or supplemented based on input from stakeholders and the public during the outreach process.

Table 2.2.2: Example Screen 2 Criteria

	Screen 2 Performance Criteria	Units	Results	
Performance	Travel Time Savings (2020, 2040)*	Minutes (Passenger/Freight/Total)	Raw Score	Qualitative
	User Benefits	Hours Saved (Passenger/Freight/Total) Fuel Saved (Passenger/Freight/Total)	TBD	TBD
	Level of Service (2020, 2040)*	Volume / Capacity Ratio (V/C)	TBD	TBD
	Travel Time Index (2020, 2040)*	Free Flow/ Congested Travel Time (Passenger/Freight/Total)	TBD	TBD
	Access to Employment Centers (2020, 2040)*	# of Origin / Destination (O/D) Trips	TBD	TBD
	Access management	Qualitative (professional judgement based on AASHTO standards, ITE Handbook)	TBD	TBD
	Safety	Qualitative (professional judgement based on AASHTO standards, ITE Handbook)	TBD	TBD
Potential Environmental and Community Impacts	Streams	Linear Feet	TBD	TBD
	Wetlands	Acres	TBD	TBD
	Lakes & Ponds	Acres	TBD	TBD
	Floodplains	Acres	TBD	TBD
	Conservation Areas/Parks/Section 4(f)	Acres	TBD	TBD
	Land and Water Conservation/Section 6(f)	#	TBD	TBD
	Protected Species Areas	Acres	TBD	TBD
	Protected Species	#	TBD	TBD
	Noise Receptors	#	TBD	TBD
	Environmental Justice Population	# of Areas	TBD	TBD
	Farmland	Acres	TBD	TBD
	Number of Displacements	# of Structures	TBD	TBD
	Residential	# of Structures	TBD	TBD
	Commercial	# of Structures	TBD	TBD
	Industrial	# of Structures	TBD	TBD
	Institutional	# of Structures	TBD	TBD
	Potential Historic Properties/Section 4(f)	#	TBD	TBD
	Potential Archaeological Sites/Section 4(f)	#	TBD	TBD
	Cemeteries	#	TBD	TBD
	Native American Interests	#	TBD	TBD
	Air Quality	Qualitative (conformity considerations)	TBD	TBD
	Indirect and Cumulative Impacts	Qualitative (potential to facilitate future development)	TBD	TBD
	Construction Impacts	Qualitative (detour potential, inconvenience to motorists and businesses)	TBD	TBD
	Mitigation / Avoidance Potential	Qualitative (cross-resource potential for avoidance/minimization/mitigation)	TBD	TBD

Screen 2 Performance Criteria		Units	Results	
Cost	Right of Way	$ (Million)	TBD	TBD
	Construction	$ (M)	TBD	TBD
	Operations and Maintenance	$ (M) /year	TBD	TBD
Other	Benefit/Cost Ratio	B/C**	TBD	TBD
	Constructability	Qualitative (professional judgement based on engineering and construction complexity)	TBD	TBD

** - 2020 and 2040 represent the ARC Travel Demand Model network years that will be used for the performance analysis.*
***- will apply the GDOT Project Prioritization Process (PrPP methodology) for B/C calculation*

Step #3: Apply Performance Criteria to Alternatives and Present Results

Each conceptual alternative evaluated as part of Screen 2 will be analyzed to the same level of detail using performance analysis tools consistent with the resource methodologies established for this study. Environmental review at this screening phase will be based on desktop analysis. Right of way assumptions for analysis were developed based on GDOT precedent for similar studies and are provided in Table 2.2.3.

Table 2.2.3: Environmental Analysis Buffer for Desktop Review

Facility Type	ROW Assumption	Analysis Width	Total
Arterial	250 Feet	200 Feet on each side	650 Feet
Freeway	300 Feet	200 Feet on each side	700 Feet

Raw data results within each analysis buffer will be calculated for each alternative and summarized in a matrix for presentation to stakeholders and the public in an easy to understand format. A qualitative labeling system, illustrated in Figure 2.2.3, will be used alongside raw data results for comparative purposes to indicate the relative performance of one alternative to another, allowing the observer to draw their own conclusions regarding the viability of the alternative based on the results and to provide their feedback regarding the alternative's potential to address the project's Need and Purpose. Results and relative performance will be considered as the project team collaborates with GDOT, FHWA, partner agencies, and the public to identify the alternatives that are reasonable to carry forward for further analysis.

Figure 2.2.3: Qualitative Labeling Scheme

Rating	
Exceeds	●
Meets	◒
Needs Improvement	○

Step #4: Advance Alternatives

The analysis performed during Screen 2 will provide the details necessary to identify the best performing alternative concepts while considering environmental impacts and community input. These alternatives will constitute the reasonable range of alternatives evaluated in detail in the DEIS.

According to SAFETEA-LU, lead agencies must provide opportunities for involvement of participating agencies and the public and consider input. The reasonable range of alternatives that will advance will be determined through agency coordination as outlined in the Agency Coordination Plan and SAFETEA-LU upon completion of the analysis. As noted in the *SR 20 Improvements from Canton to Cumming Agency Coordination Plan*, selection of the reasonable range of alternatives to advance into the DEIS is an agency coordination point. This milestone includes engagement of the TAC, CACs, and the public to discuss what alternatives should advance into the DEIS Analysis, based on the findings to date. If agreement on a reasonable range of alternatives cannot be achieved based on the findings at the conclusion of Screen 2, additional analysis could be conducted based on the identification of additional criteria consistent with Need and Purpose and identified in conjunction with GDOT, FHWA, and the CACs and TAC.

2.2.3 Screen 3: DEIS

Step #1: Determine Reasonable Range of Alternatives to Advance to the DEIS

The alternatives that advance from Screen 2, will become the reasonable range of alternatives to be further analyzed in the DEIS.

Step #2: Conduct DEIS Analysis

The reasonable range of alternatives advanced into the DEIS Analysis will incorporate more specificity into the design elements and location of each alignment. Each alternative will be advanced to the same level of detail and will be subject to the detailed resource methodology established in the *SR 20 Improvements from Canton to Cumming Methodologies* document. These studies include field work and detailed analysis summarized in a reader-friendly Question and Answer formatted DEIS with detailed analysis included in technical appendices.

The environmental documentation will compare the DEIS Alternatives, based on impacts to the natural, human, and cultural environment, and will evaluate indirect and cumulative impacts and mitigation. The performance criteria to be used in the DEIS on

which the evaluation of the alternatives will be based include: air, noise, history, archaeology, wetlands and waters of the U.S./State, hazardous materials/underground storage tanks, community impacts (including environmental justice populations), economic impacts, social impacts, displacements, energy-greenhouse gases/climate change, land use impacts, Section 4(f), Section 6(f), and utilities/construction. The alternatives will be examined against the results of each of these detailed environmental resource analyses. These DEIS alternatives will be summarized and the result will be a matrix that will demonstrate the negative, neutral, and positive effects that each DEIS alternative has on these resources, Need and Purpose, and all categories evaluated in the DEIS. Based on the results of the technical studies completed during the DEIS analysis, the reasonable range of alternatives will be evaluated to select a preferred alternative.

Step #3: Present Results

Stakeholder and community input will be gathered during the DEIS through the CACs, TAC, Public Meetings, and other outreach opportunities consistent with the *SR 20 Improvements from Canton to Cumming Public Involvement Plan*. The Screen 3 evaluation will be presented as a summary of overall DEIS findings and discussion of the recommended preferred alternative based on those findings. Stakeholders and the public will have an opportunity to review and comment on the recommendation. The alternative ultimately identified as preferred based on this analysis and discussion will be disclosed in the DEIS document prior to the public comment review period.

Step #4: Identify the Preferred Alternative

The Alternatives Analysis Technical Report will summarize the findings of each resource study as well as the discussion with the TAC, CACs, and the Public. The identification and advancement of the Preferred Alternative will incorporate an evaluation of the overall comparison of impacts for each of the reasonable range of alternatives. This process will follow the same approach as previously described above. During the public comment period for the DEIS, stakeholders and the public will have an additional opportunity to review and provide feedback on the alternatives studied and analysis results. This information will inform the identification of a Preferred Alternative.

3.0 NEXT STEPS

The proposed Alternatives Screening Methodology is a phased process designed to help identify those alternatives that are acceptable in terms of performance and to inform decisions about which alternatives warrant further consideration in the analysis process. This screening process provides a transparent analysis of potential alternatives and also informs the identification of potentially significant impacts that must be mitigated during the project development process. This process is an evaluation framework, and the potential alternatives and criteria included in this document are based on initial technical analysis and knowledge of the corridor. It is anticipated that they will be refined as the process is implemented. The implementation of this framework will be an iterative process that may evolve through collaboration with stakeholders and the public during the environmental process. The Alternatives Analysis Technical Report will fully document each step of the implementation of this process and will be appended to the SR 20 Improvements from Canton to Cumming environmental document.

3.1 Summary of Stakeholder and Public Involvement Milestones

There are three key stakeholder and public involvement milestones critical to the Alternatives Analysis process described herein. These activities are summarized in Table 3.0.

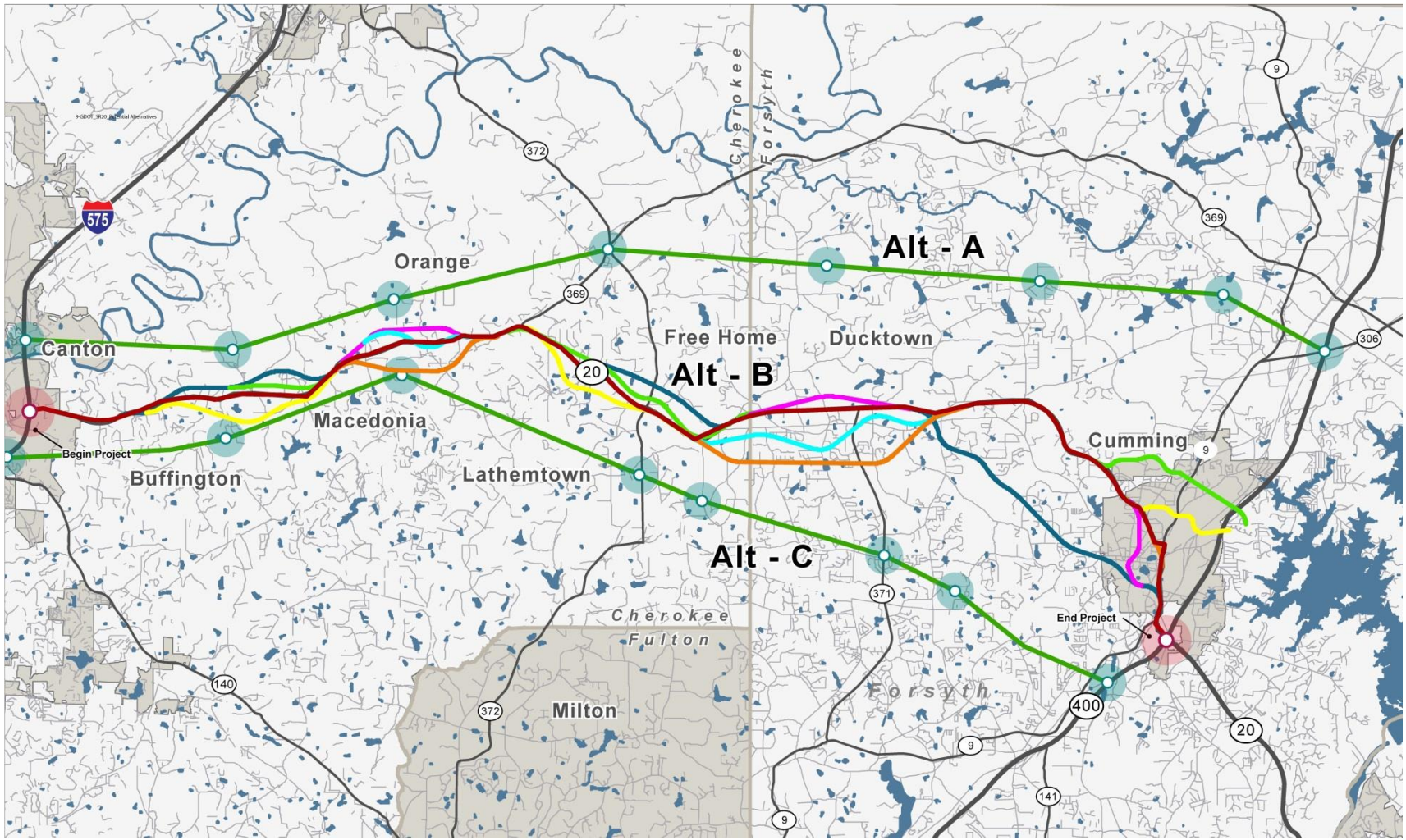
Table 3.0: Alternatives Analysis Stakeholder and Public Involvement Milestones

	Topics Presented for Feedback	Events	Desired Timeline
Round 1 (After Screen 1)	• Scoping Results • Need and Purpose / Goals and Objectives • Screen 1 Results (Fatal Flaw Strategy Screen) • Preliminary Alternatives to evaluate in Screen 2 • Preliminary Evaluation Criteria to apply in Screen 2	TAC Meeting CAC Meetings (2) PIOH Meetings (2) Online Materials EJ Outreach	Fall 2013
Round 2 (After Screen 2)	• Alternatives Considered • Screen 2 Results (Evaluation of Conceptual Alternatives) • Recommended Reasonable Range of Alternatives to be evaluated in the DEIS	TAC Meeting CAC Meetings (2) PIOH Meetings (2) Online Materials EJ Outreach	Winter / Spring 2014
Round 3 (After Screen 3)	• Reasonable Range of Alternatives • Screen 3 Results (DEIS Analysis of Reasonable Range of Alternatives)	TAC Meeting CAC Meetings (2) PHOH Meetings (2) Online Materials EJ Outreach	TBD

Appendix A

Potential Alternatives Map

Potential Alternatives Map



Note: Map represents preliminary conceptual alignments for the strategies advancing to Screen 2. Specific location details and design features of each alternative are under development and will be included in the Alternatives Analysis Technical Memorandum.